इंटरनेट मानक

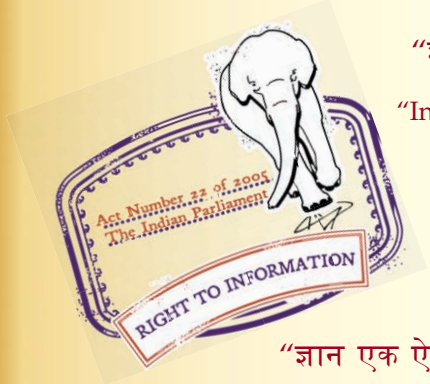
Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 9121 (2005): Inspection Gauges for Checking Type 1 (Size 2) Taper Threads of Gas Cylinder Valves, Taper 1 in 16 [MED 16: Gas Cylinders]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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भारतीय मानक

गैस सिलिंडर वाल्व की 1/16 शुंडाकार, टाइप 1 (साइज 2) चूड़ियों की जाँच के लिए निरीक्षण गेज — विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

INSPECTION GAUGES FOR CHECKING TYPE 1 (SIZE 2) TAPER THREADS OF GAS CYLINDER VALVES, TAPER 1 IN 16 — SPECIFICATION

(First Revision)

ICS 17.040.01 : 23.020.30

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 2005

Price Group 8

FOREWORD

This Indian Standard (First Revision) was adopted by Bureau of Indian Standards, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Division Council.

In this standard, changes have been incorporated in the light of the experience gained by the industry and consumers over the years. The requirement of limits on taper of both internal and external threads provided in the standard for the NGT threads ANSI/CSA/ STANDARD V-1-1987 'Compressed gas cylinder valve outlet and inlet connection' issued by the American National Standard Institute and Compressed Gas Association, Inc., this being the standard forming the basis of these threads. Relevant portions of the specification of the threads have been reproduced in this revision. With this requirement to inspect the taper of the threads, the method of checking relative engagement of the product threads in the threaded and plain taper ring and plug gauges has been included in this revision.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is compiled with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in a accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSPECTION GAUGES FOR CHECKING TYPE 1 (SIZE 2) TAPER THREADS OF GAS CYLINDER VALVES, TAPER 1 IN 16 — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes dimensions, tolerances and material requirement of inspection gauges recommended for checking the taper threads on the valve stems and the taper threads on the cylinder necks of compressed gas cylinders — the threads conforming to Type 1 (size 2) covered in IS 3224 and Type 1 covered in IS 8737.

2 REFERENCES

The standards listed below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No.	*Title*
1570 (Part 2) : 1979	Schedules for wrought steels: Part 2 Carbon steels (unalloyed steels) (*first revision*)
1586 : 2000	Method for Rockwell Hardness test for metallic material (Scales A-B-C-D-E-F-G-H-K 15N, 30N, 45N, 15T, 30T and 45T) (*third revision*)
3224 : 2002	Valve fittings for compressed gas cylinders excluding liquefied petroleum gas (LPG) cylinders — Specification (*third revision*)
8737 : 1995	Valve fittings for use with liquefied petroleum gas (LPG) cylinders of more than 5 litre water capacity — Specification (*first revision*)

3 MATERIAL

Suitable wear resisting, steel, for example, 85C6 of IS 1570 (Part 2) may be used.

4 DIMENSIONS OF THREADS ON VALVE STEMS AND IN CYLINDER NECKS

4.1 Basic Thread Form (*see* Fig. 1)

4.2 Principal Dimensions (*see* Fig. 2)

4.3 Limits on Crest and Root Truncations (*see* Fig. 3)

4.4 Limits on Size

Final inspection limits on size (pitch diameter) of both external and internal threads are ± 1 turn from basic although the preferred working limits are ± ½ turn from basic.

4.5 Limits on Taper

If there is an unintentional difference in taper at the pitch elements of the valve and of the cylinder threads, it is preferred to have greater tightness at the bottom of the valve. The limits in gauging shall be:

a) Taper on pitch elements of external threads shall be 1 in 16 on diameter, with a minus tolerance of one turn, but no plus tolerance in gauging.

b) Taper on pitch elements of internal threads shall be 1 in 16 on diameter, with a plus tolerance of one turn, but no minus tolerance in gauging.

4.6 The tolerance on 60° angle of threads shall be ± 2°.

4.7 The maximum taper on pitch line per millimetre shall be 0.072 9 and the minimum 0.057 3.

5 DIMENSIONS AND TOLERANCES OF GAUGES FOR CHECKING THREADS IN CYLINDER NECK (INTERNAL THREADS)

5.1 Taper Thread Plug Gauge for Checking Pitch Diameter in Cylinder Neck L_1, Gauge A (*see* Fig. 4)

5.2 Full Form Taper Thread Plug Gauge for Checking Thread in Cylinder Neck L_9, Gauge B (*see* Fig. 5)

5.3 Plain Taper Plug Gauge for Checking Crest Truncations of Internal Thread, Gauge C (*see* Fig. 6)

6 DIMENSIONS AND TOLERANCES OF GAUGES FOR CHECKING THREADS ON VALVE STEMS (EXTERNAL THREADS)

6.1 Taper Screw Ring Gauge for Checking Thread of Taper Stem L_1, Gauge D (*see* Fig. 7)

6.2 Full Form Taper Screw Ring Gauge for Checking Thread of Taper Stem L_8, Gauge E (*see* Fig. 8)

6.3 Plain Taper Ring Gauge for Checking Crest Truncations of External Threads, Gauge F (*see* Fig. 9)

7 DIMENSIONS AND TOLERANCES OF MASTER PLUG GAUGES

7.1 Master Taper Screw Ring Gauge (Gauge M-INT), to Check L_1 (Gauge A) and L_9 (Gauge B) (*see* Fig. 10)

7.2 Master Taper Thread Plug Gauge (Gauge M-EXT), to Check L_1 (Gauge D) and L_8 (Gauge E) (*see* Fig. 11)

8 USAGE OF GAUGES

Usage of gauges is given in Annex A.

9 GENERAL REQUIREMENTS OF GAUGING SURFACES

9.1 Hardness

Minimum 60 to 62 HRC (Rockwell, Scale C) when determined according to IS 1586.

9.2 Finish

Gauging surfaces shall be ground, lapped and suitably stabilized. The method of stabilizing shall be as per agreement between the manufacturer and the supplier. Surfaces other than the gauging surfaces shall be furnished smooth.

10 DESIGNATION

The gauges shall be designated by:

Gauge type and number of this standard

Example:

A taper screw ring gauge for checking pitch diameter of taper stem at length L_1 shall be designated by:

Gauge *D*, IS 9121

11 CORROSION PROTECTION AND PACKING

Gauges shall be protected against climatic conditions by application of any anti-corrosive coating. Packing should be suitable to prevent damage in transit.

12 MARKING

12.1 The gauge shall be marked with the following:

a) Designation,

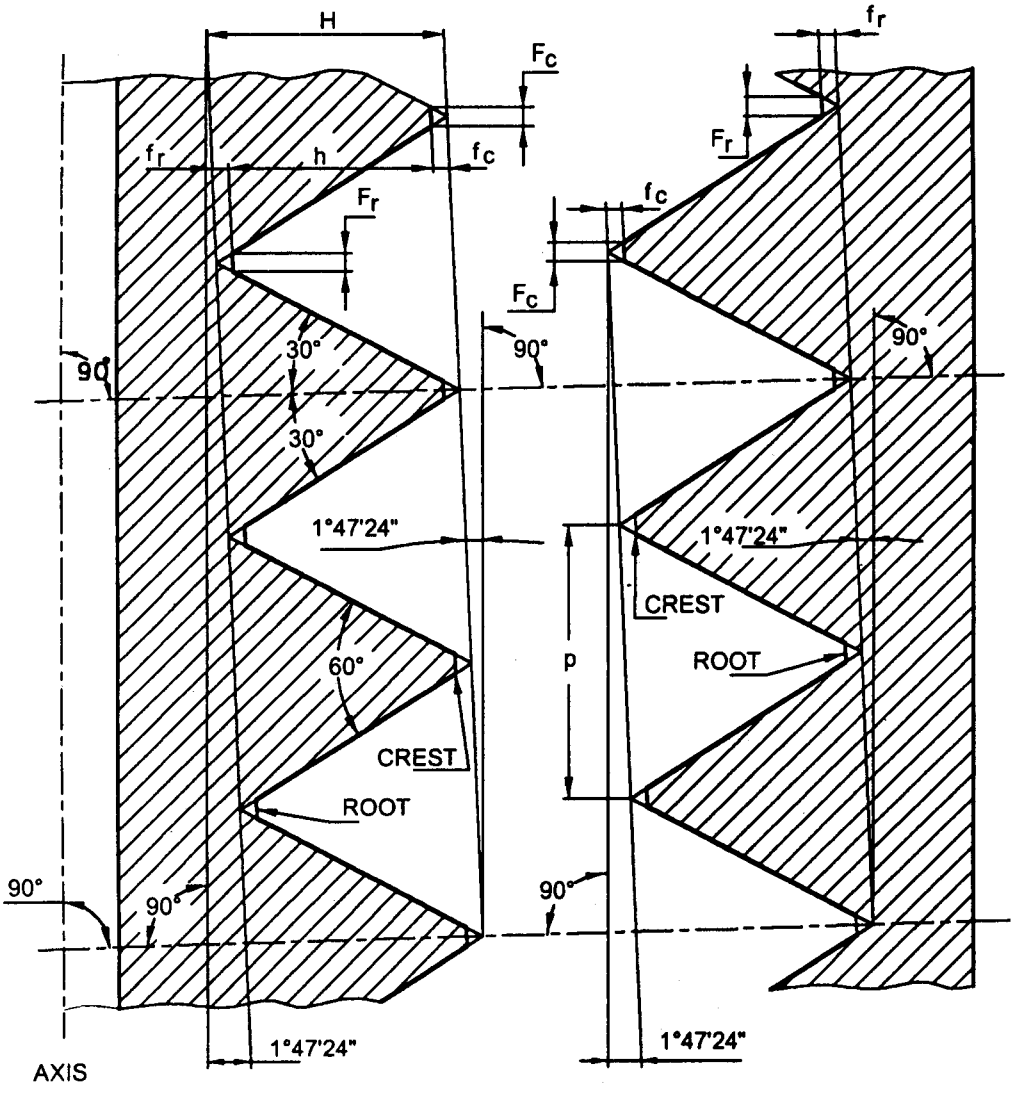
b) Manufacturer's name or trade-mark, and

c) Serial number.

12.2 BIS Certification Marking

The gauge may also be marked with the Standard Mark.

12.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from Bureau of Indian Standards.



EXTERNAL THREAD INTERNAL THREAD

Pitch measured parallel to axis, $p = 1.814$

Thread angle 60° normal to the axis

Taper 1 in 16 measured on the diameter along the axis

H = 0.866 025 p – height of 60° sharp V thread = 1.571 22

h = 0.800 000 p = height of thread on product = 1.451 43

f_c[1)] = Depth of truncation at crest, f_r[1)] = Depth of truncation at root

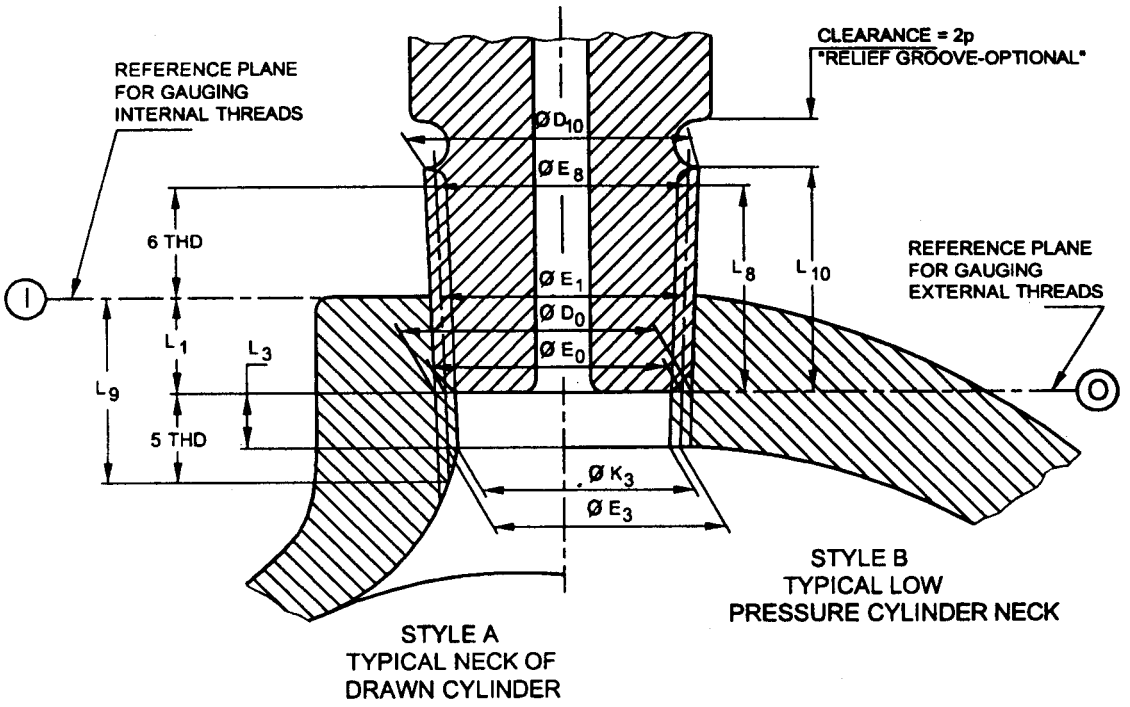
F_c[1)] = Width of flat at crest, F_r[1)] = Width of flat at root

[1)] For limits *see* **4.3**.

NOTE — The thread is same as ¾" —14 National Gas Taper (NGT) threads of ANSI/CSA/CGA STANDARD V-1—1987.

All dimensions in millimetres.

FIG. 1 BASIC THREAD FORM



D = Major diameter

D_0 = 26.03

D_{10} = 27.42

E = Pitch diameter

E_0 = 24.58

E_1 = 25.118

E_3 = 24.24

E_8 = 25.798

K = Minor diameter

K_3 = 22.79

L_1 = Standard handtight engagement = 8.611

L_3 = 3 threads (for wrenching)

$L_1 + L_3$ = 14.05

L_8 = Length of full external threads = 19.497

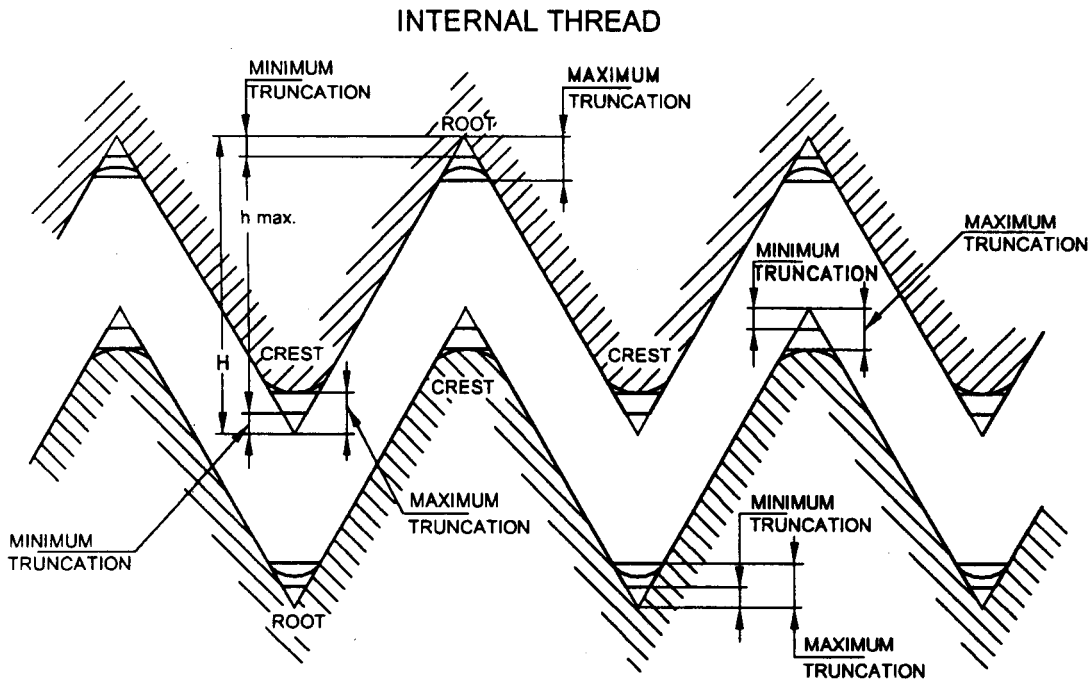
L_9 = Length of full roots (minimum) on internal threads = 17.681

L_{10} = Overall length of external threads (approx) = 23

Diameter at small end of the valve after chamfer = 23

All dimensions in millimetres.

FIG. 2 PRINCIPAL DIMENSIONS



p = Pitch = 1.814

H = Height of sharp V thread = 0.866 025 p = 1.571 22

h = Height of thread on product = 1.451 4, *Max*/1.288 0, *Min*

f = Truncation on crest and root

f_{Min} = 0.033 p = 0.059 87

f_{Max} = 0.078 p = 0.141 51

Tolerance = 0.081 64

F = Equivalent width of flat

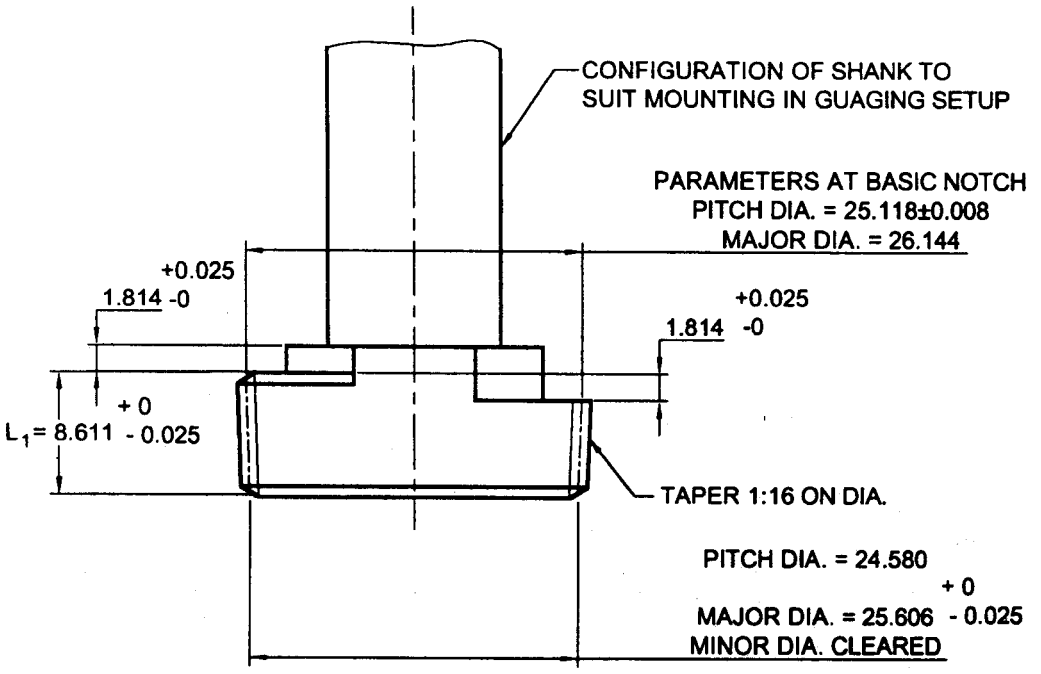
F_{Min} = 0.038 p = 0.068 94

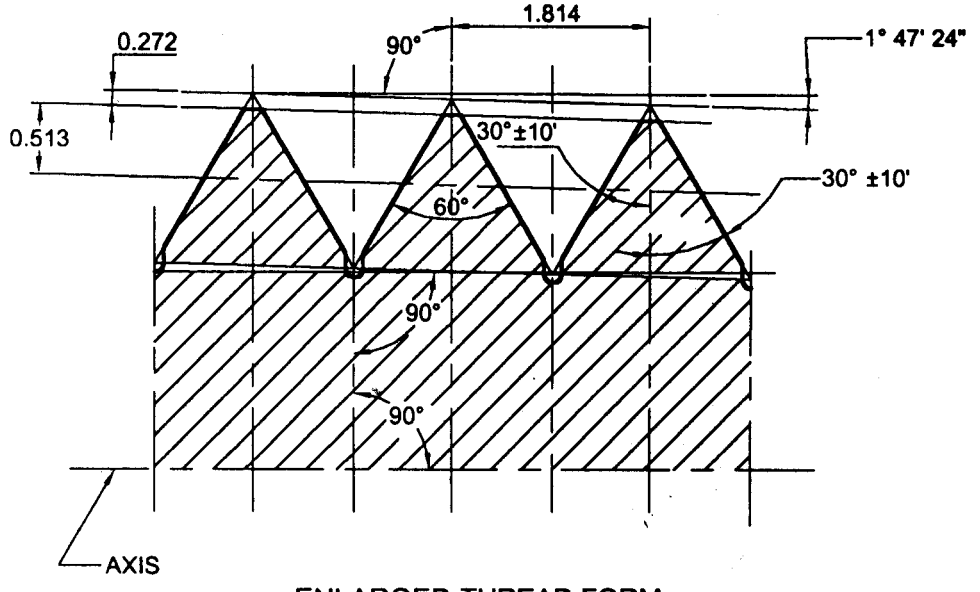
F_{Max} = 0.090 p = 0.163 29

Tolerance = 0.094 35

All dimensions in millimetres.

FIG. 3 LIMITS ON CREST AND ROOT TRUNCATIONS





ENLARGED THREAD FORM

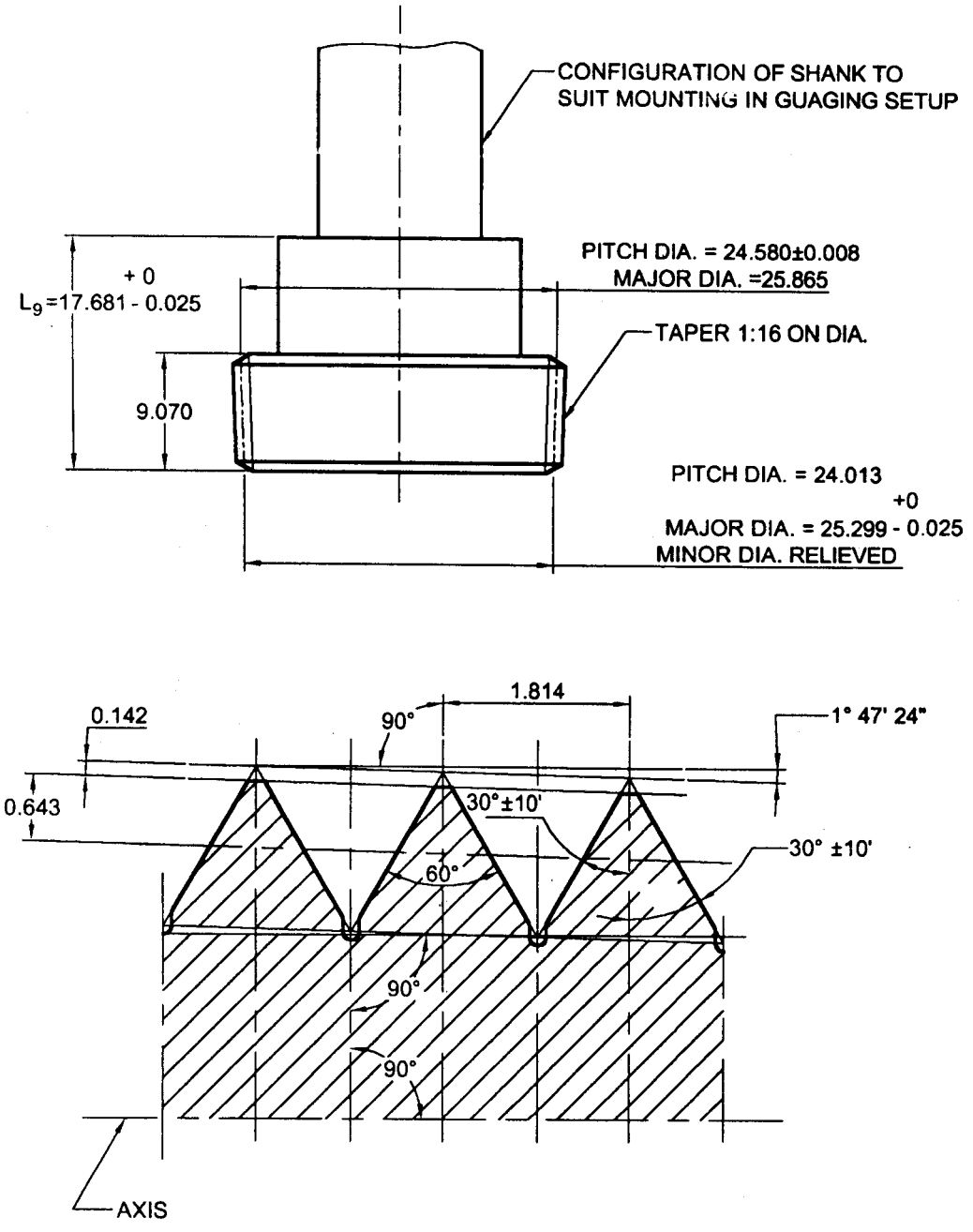
Taper 1 in 16 on diameter

Tolerance on taper in length, L_1 = $^{+0.015}_{-0}$

Tolerance of lead in length, L_1 = ± 0.005

All dimensions in millimetres.

FIG. 4 TAPER THREAD PLUG GAUGE TO CHECK PITCH DIAMETER IN CYLINDER NECK, GAUGE 'A' (L_1)



ENLARGED THREAD FORM

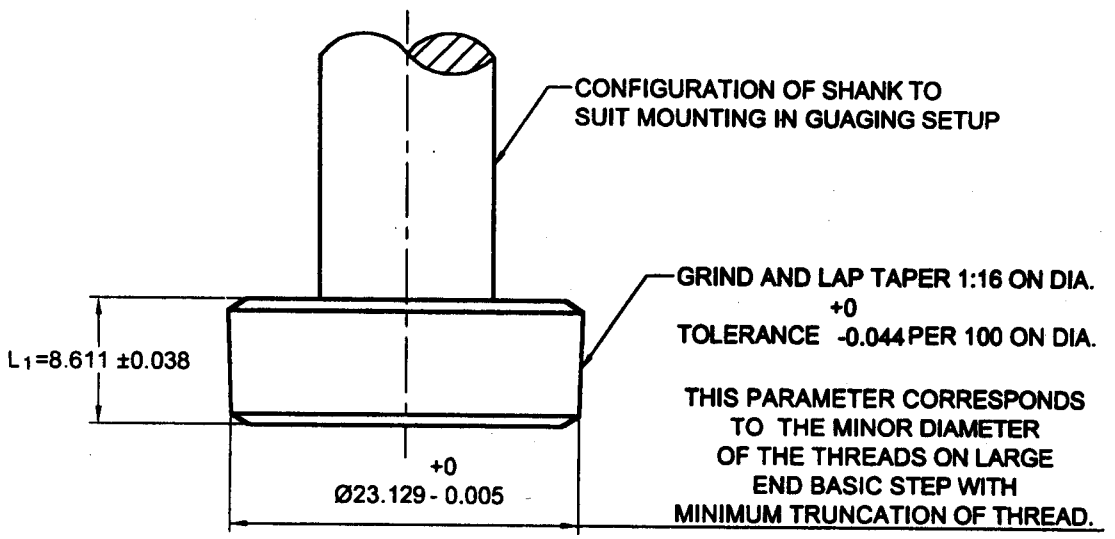
Taper 1 in 16 on diameter

Tolerance on taper in length 9.070 = $^{+0.015}_{-0}$

Tolerance of lead in length 9.070 = ± 0.005

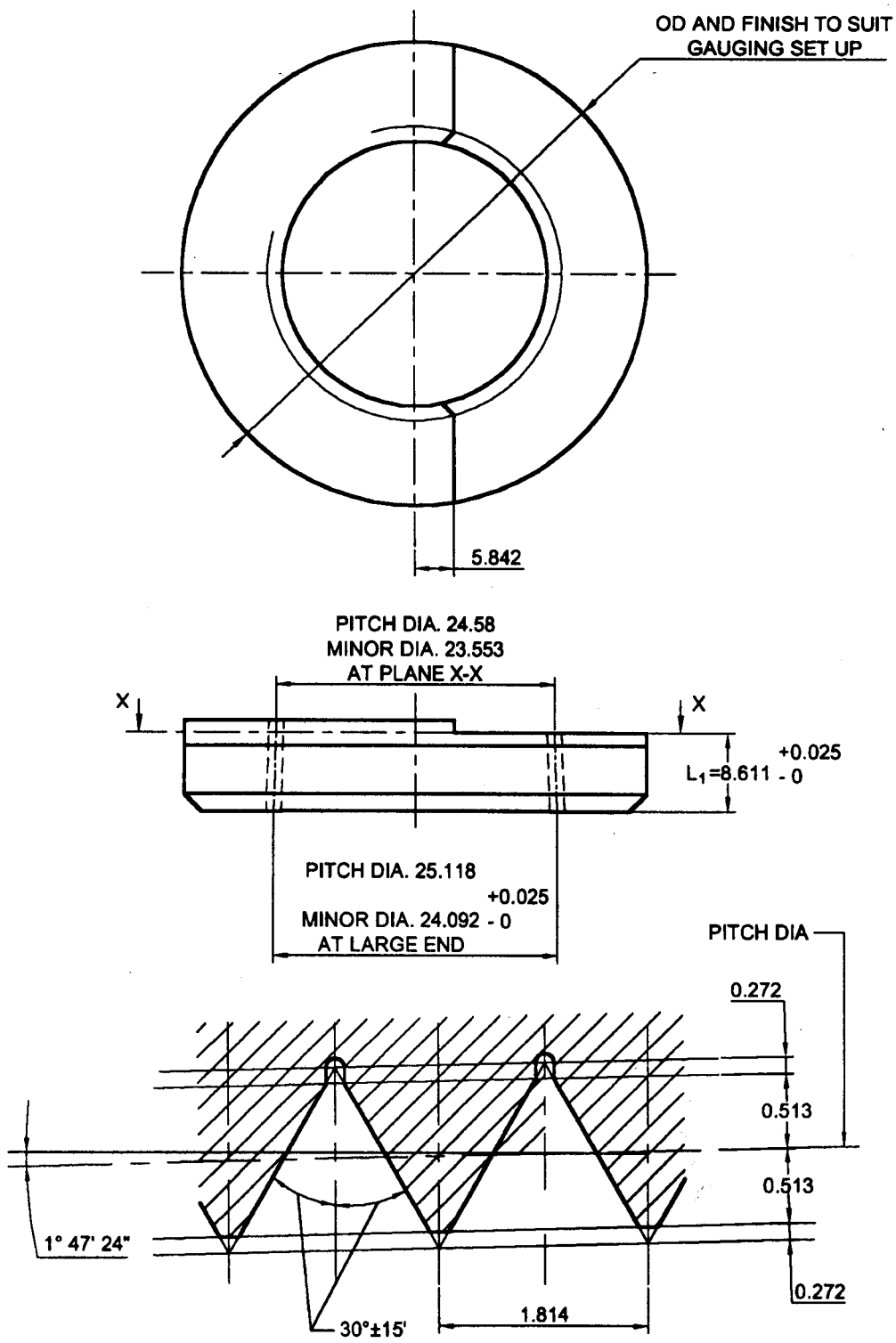
All dimensions in millimetres.

FIG. 5 FULL FORM TAPER THREAD PLUG GAUGE FOR CHECKING THREAD IN CYLINDER NECK, GAUGE 'B' (L_9)



All dimensions in millimetres.

FIG. 6 PLAIN TAPER PLUG GAUGE TO CHECK CREST TRUNCATION IN CYLINDER NECK, GAUGE 'C'



ENLARGED THREAD FORM

Taper 1 in 16 on diameter

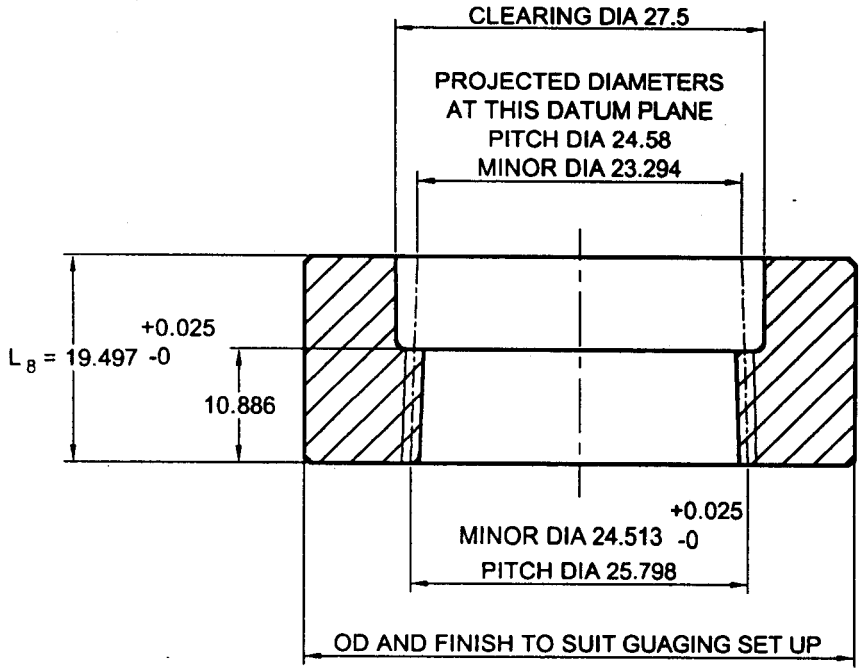
Tolerance in length, L_1 = $^{+0}_{-0.023}$

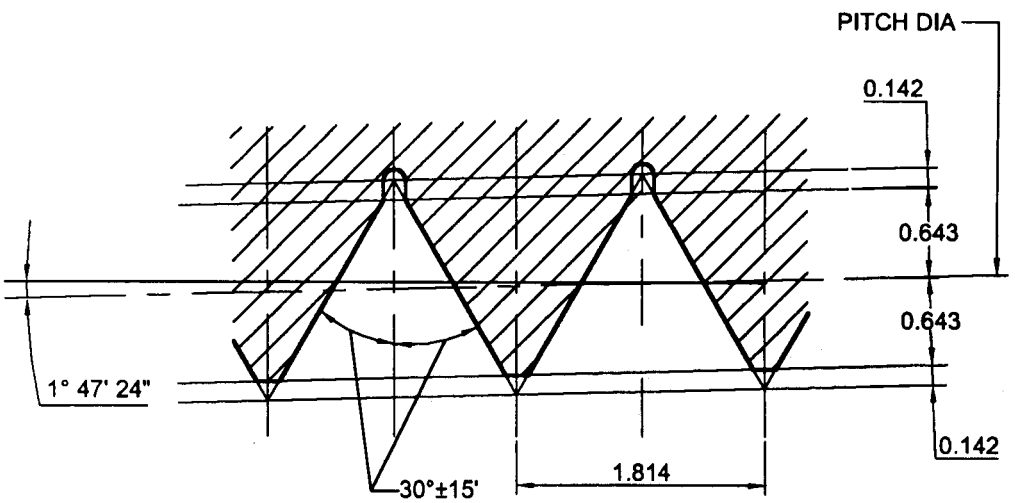
Right hand thread normal to axis

Tolerance of lead in length, L_1 = ±0.008

All dimensions in millimetres.

FIG. 7 TAPER SCREW RING GAUGE TO CHECK TAPER THREAD ON VALVE STEM, GAUGE 'D' (L_1)





ENLARGED THREAD FORM

Taper 1 in 16 on diameter

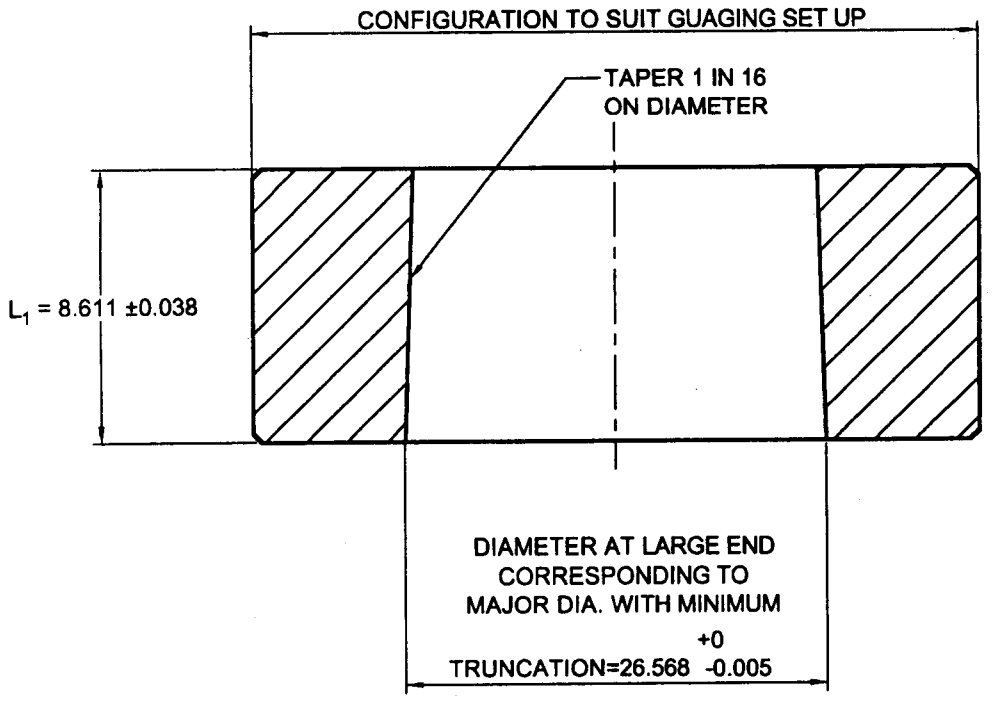
Tolerance in length 10.886 = $^{+0}_{-0.023}$

Right hand thread normal to axis

Tolerance of lead in length 10.886 = ± 0.008

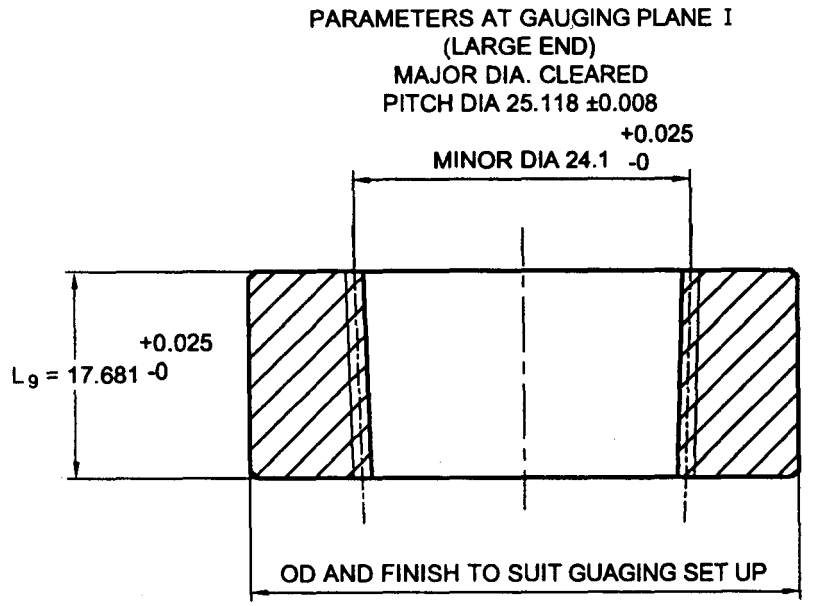
All dimensions in millimetres.

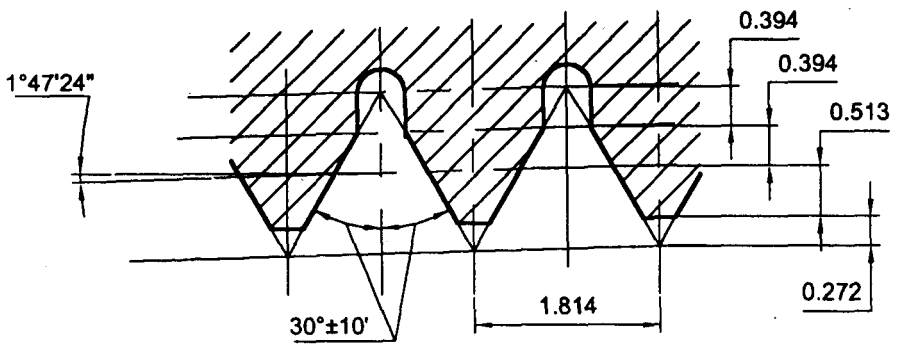
FIG. 8 FULL FORM TAPER SCREW RING GAUGE TO CHECK THREAD ON VALVE STEM, GAUGE 'E' (L_8)



All dimensions in millimetres.

FIG. 9 PLAIN TAPER RING GUAGE TO CHECK CREST TRUNCATION OF EXTERNAL THREAD, GAUGE 'F'





ENLARGED THREAD FORM

Taper 1 in 16 on diameter

Tolerance on taper in length, L_1 = $^{+0.015}_{-0}$

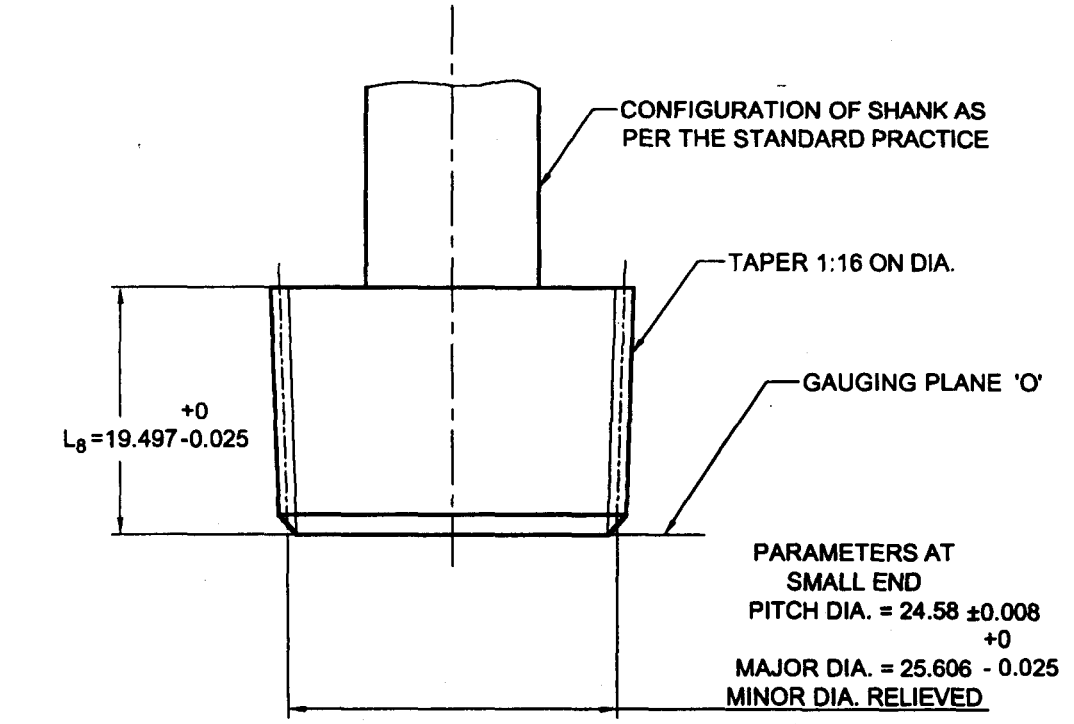
Right hand thread normal to axis

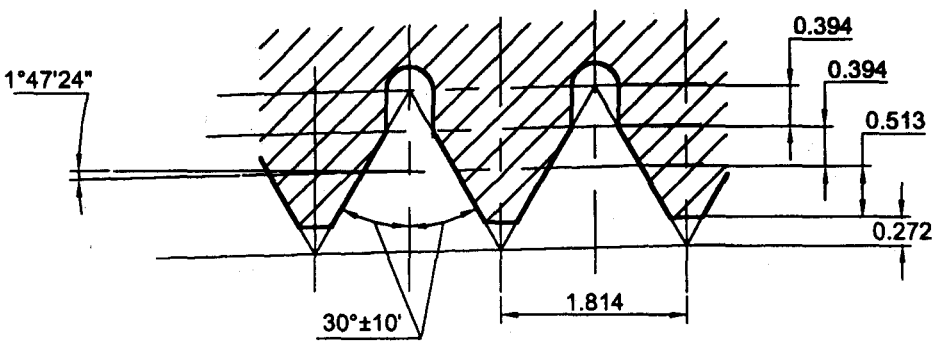
Tolerance of lead in length 17.681 = ±0.005

NOTE — The maximum permissible wear on taper thread plug gauges L_1 and L_9 shall be equivalent to ½ turn from basic. Accordingly, basic reference plane of master taper screw ring gauge (Gauge M-INT) shall protrude by maximum 0.9 mm from the basic step of the Plug gauges L_1 and L_9. The setting of the dial indicators in the gauging set-up (*see* Fig. 13) shall be done with reference to the basic reference face of the master taper screw ring gauge (Gauge *M-INT*).

All dimensions in millimetres.

FIG. 10 MASTER TAPER SCREW RING GAUGE, 'M-INT'





ENLARGED THREAD FORM

Taper 1 in 16 on diameter

Tolerance on taper in length, L_1 = $^{+0.015}_{-0}$

Right Hand Thread normal to axis

Tolerance of lead in length 19.497 = ±0.005

NOTE — The maximum permissible wear on taper screw ring gauges L_1 and L_8 shall be equivalent to ½ turn from basic. Accordingly, basic reference plane of master taper screw ring gauge (Gauge M-EXT) shall protrude by maximum 0.9 mm from the basic step of the Plug gauges L_1 and L_8. The setting of the dial indicators in the gauging set-up (*see* Fig. 12) shall be done with reference to the basic reference face of the master taper thread plug gauge (Gauge *M-EXT*).

All dimensions in millimetres.

FIG. 11 MASTER TAPER THREAD PLUG GAUGE, 'M-EXT'

ANNEX A

(*Clause* 8)

USAGE OF GAUGES

A-0 Special gauges are required for the gauging of these threads because of their length and the rigid requirement for sealing the compressed gas against leakage.

A-1 PITCH DIAMETER OF EXTERNAL THREAD

To check the size of the external thread for pitch diameter, the thread ring gauge D is used. This gauge D (also known as L_1 ring gauge) is the primary gauge because the reading taken on this gauge will be needed for use when additional gauging is done.

A-1.1 The gauge E (also known as L_8 ring gauge) is used to check the taper of the external threads. It is screwed on to the valve stem thread and its engagement relative to that of the L_1 ring read at **A-1** is noted.

A-2 CREST TRUNCATION OF EXTERNAL THREAD

To check the crest truncation of the external thread, the plain taper ring gauge F (also known as truncation gauge) is used. This gauge is placed over the taper thread and the engagement relative to that of L_1 ring at **A-1** is checked.

A-3 Gauging of the thread with the three ring gauges as stated above is illustrated hereunder with reference to Fig. 13:

a) To set the L_1 and L_8 taper screw ring gauges (gauges D and E respectively), use master taper thread plug gauge M-EXT (*see* Fig. 11) screwed into the rings and set the reading on the dial indicator at zero with the plunger tip on the indicator resting against small end (reference face) of the master taper thread plug ensuring that the whole millimetre readings on the small dials is also equal on both the dials.

b) To set the plain taper truncation ring (gauge F), insert the setting distance piece (*see* Fig. 12) into the gauge with the face *X* of the setting plug pressed against the large end face of the truncation ring. Set the plunger tip of the dial indicator against the face *Y* of the setting plug and adjust the dial at zero ensuring that the whole millimeter readings on the small dial is identical to that on the small dials of the two gauges as given in **A-3** (a).

c) Screw the valve stem in taper thread ring gauge D and note the reading on the dial indicator. The reading should be zero (as set on the dial indicator) ±1.814 mm for the purpose of acceptability of the thread size. Note this reading as $R_{(EXT)L_1}$.

d) Screw the valve stem into gauge E. The reading on the dial indicator should be $R_{(EXT)L_1}{}^{+1.814}_{-0}$ for the purpose of acceptability of the requirement of relative engagement (*see* **4.5**).

e) Place the valve stem into plain taper ring gauge F. The reading on the dial indicator should be $R_{(EXT)L_1}$ +2.60 for the purpose of acceptability of the crest truncation of the thread.

A-4 PITCH DIAMETER OF INTERNAL THREAD

To check the size of the internal thread for pitch diameter, the thread plug gauge A is used. This gauge A (also known as L_1 plug gauge) is the primary gauge because the reading taken on this gauge will be needed for use when additional gauging is done.

A-4.1 The gauge B (also known as L_9 plug gauge) is used to check the engagement relative to that with L_1 plug gauge.

A-5 CREST TRUNCATION OF INTERNAL THREAD

To check the crest truncation of the internal thread, the plain taper plug gauge C (also known as truncation gauge) is used. This gauge is placed into the internal taper thread and the engagement relative to that with L_1 plug is checked.

A-6 The gauging of the internal thread with the three gauges as stated above is illustrated hereunder with reference to Fig. 13:

a) Using the master taper screw ring shown in Fig. 10 and the plunger tips of the respective dial indicators resting against the face of the master ring, set the readings on all the dial indicators at zero ensuring that the whole millimetre readings on the small dials is also equal on all the three dials.

b) Screw the taper thread plug gauge A into the internal thread to be gauged and note the reading on the dial indicator. The reading should be ± 1.814 mm for the purpose of acceptability of the thread size. Note this reading as $R_{(INT)L_1}$.

c) Screw the taper thread plug gauge B into the internal thread being gauged. The reading on the dial indicator should be $R_{(INT)L_1}{}^{+0}_{-1.814}$ mm for the purpose of acceptability of meeting the requirement of relative engagement (*see* **4.5**).

d) Now place the plain plug gauge C into the internal thread to be gauged. The reading on the dial indicator should be $R_{(INT)L_1}{}^{+2.60}_{-0}$ for the purpose of acceptability of the crest truncation of the thread.

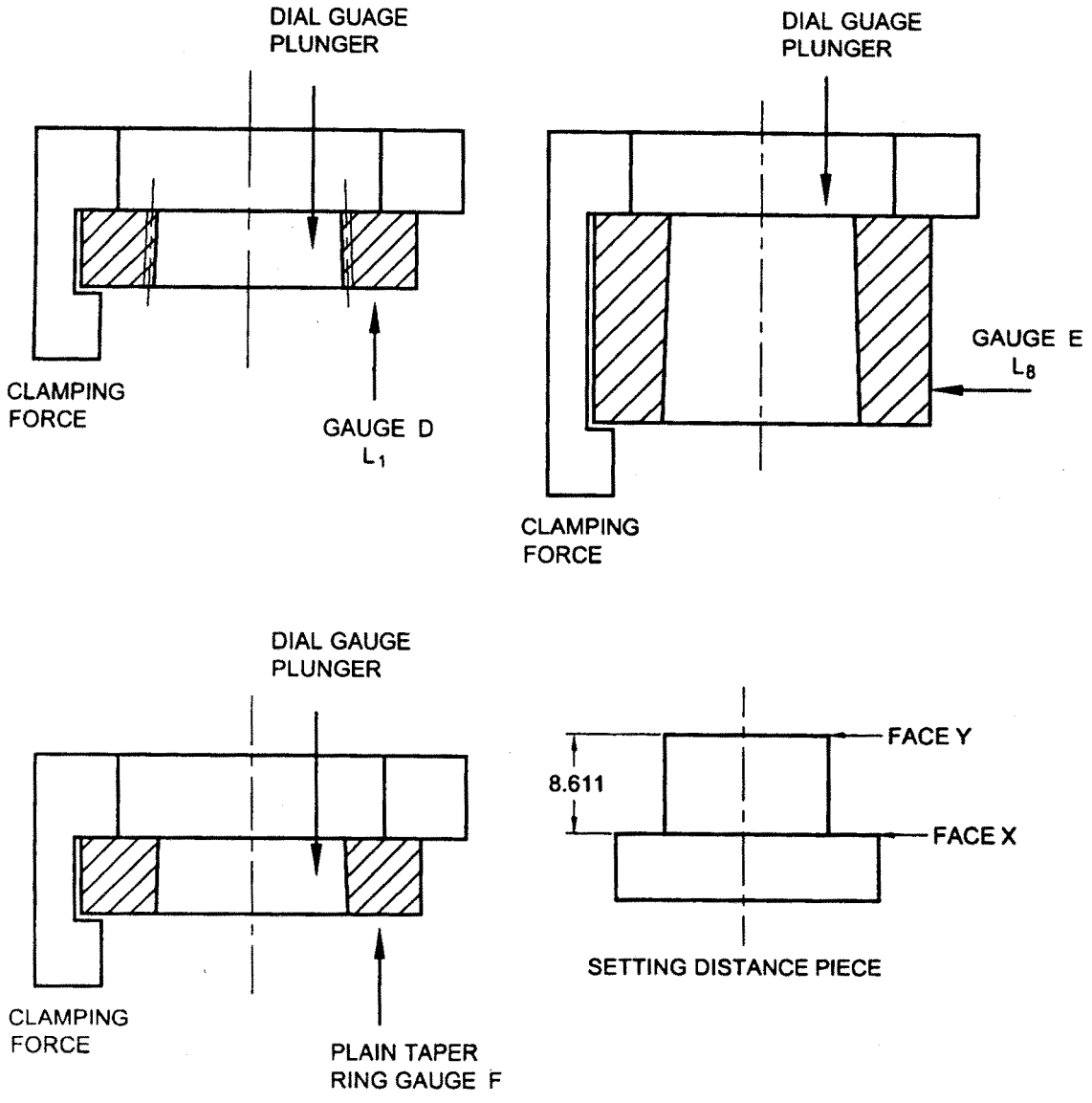
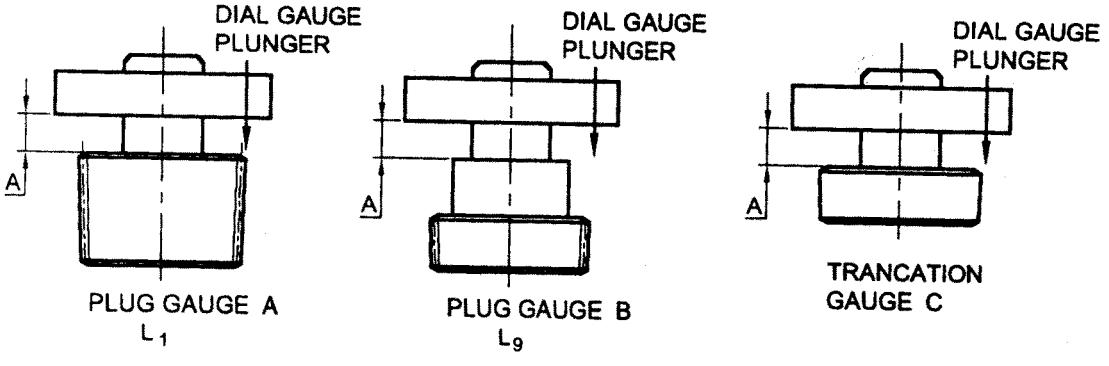


FIG. 12 GAUGING SET-UP TO CHECK EXTERNAL TAPER THREADS ON VALVE STEM



A = STANDARD (CONSTANT) DISTANCE PIECE FOR THREE GAUGES
(SET THE GAUGING STEP WITH THE DISTANCE PIECE)

FIG. 13 GAUGING SET-UP TO CHECK INTERNAL TAPER THREADS IN CYLINDER NECK

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Gas Cylinders Sectional Committee, ME 16

Organization	*Representative(s)*
Department of Explosives, Nagpur	SHRI A. ANBUNATHAN (***Chairman***) SHRI C. R. SURENDRANATHAN (*Alternate*)
All India Industrial Gases Manufacturers Association, New Delhi	SHRI SATISH KOTCHER SHRI S. DEB (*Alternate*)
Balmer Lawrie and Co Ltd, Mathura	SHRI K. GOPINATHAN SHRI DEBASHIS DASS (*Alternate*)
Bharat Petroleum Corporation Ltd, Mumbai	SHRI THARIYAN GEORGE SHRI S. K. DEY (*Alternate*)
Bharat Pumps and Compressors Ltd, Allahabad	SHRI UTTAM KUMAR SHRI S. K. TEWARI (*Alternate*)
BOC India Ltd, Kolkata	SHRI P. K. BHATTACHARYA SHRI D. MUKERJEE (*Alternate*)
Everest Kanto Cylinder Ltd, Aurangabad	SHRI AJIT K. PARIKH SHRI P. M. SAMVATSAR (*Alternate*)
Everest Kanto Cylinder Ltd, Tarapur	SHRI V. K. KHOT SHRI A. G. KHAMKAR (*Alternate*)
Hindustan Petroleum Corporation Ltd, Mumbai	SHRI P. D. NADKARNI SHRI D. N. KRISHNAMURTHY (*Alternate*)
Indian Oil Corporation Ltd, Mumbai	SHRI S. S. SAMANT SHRI RAJESH HAZARNIS (*Alternate*)
International Industrial Gases Ltd, Kolkata	SHRI DEVENDRA K.GARG SHRI NIKHILESH K.GARG (*Alternate*)
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